

FOREWORD

The phenomena of superconductivity and magnetism have remained at the center stage of condensed matter science over the entire twentieth century. Once considered mutually exclusive, the two phenomena are seen to coexist and the interplay between them forms one of the most exciting aspects of present day research in condensed matter physics and materials science. The discovery of superconductivity above the boiling point of liquid nitrogen in cuprates, colossal magnetoresistance (CMR) in manganites, superconductivity and its coexistence with magnetic order in ternary alloys, quaternary borocarbides and boronitrides, superconductivity in Fullerenes, etc. have all provided such an impetus to the field of superconductivity and magnetism since 1986 that the physics, chemistry, materials and devices aspects have become inseparable in the strongly correlated electron systems.

The International Symposium titled “Advances in Superconductivity and Magnetism: Materials, Mechanisms and Devices (ASMM2D-2001)”, focused on some of the contemporary aspects of the above two phenomena. Several groups in various institutions, laboratories and universities in India are actively engaged in magnetism and superconductivity, and many Indian researchers have made noteworthy contributions. For example, a variety of new materials, such as new superconductors, valence fluctuation compounds, heavy fermion systems, etc. have been discovered/identified in India. Important contributions, such as, superconductivity in thin films with the highest J_c and the lowest microwave surface resistance, Josephson junctions and SQUID devices of superconductors, etc. have been achieved. There is also a widespread interest in understanding the statistical physics of pinned vortices, which has bearing on the applications of high T_c superconductors and the CMR based composite devices.

The symposium ASMM2D-2001 was held from September 25–28, 2001 in the pleasant environs of Mangalore University campus, which is located on a picturesque hilly region known as Mangalagangothri, about 20 kms from the tranquil city of Mangalore. Amongst all the Indian universities, Mangalore University is one of those few universities which has a Materials Science Department distinct from its Departments of Physics and Chemistry. It was the aim of the organizers that the successful conduct of ASMM2D-2001 at Mangalore University campus would strengthen the impetus to the inter-disciplinary research, encompassing the infrastructure and expertise available in the Departments of Materials Science, Physics and Chemistry.

ASMM2D-2001 was inaugurated on Tuesday, September 25, 2001 by Professor S S Jha, Director, TIFR in the New Senate Hall of Mangalore University. The Symposium had a very busy schedule, with two parallel sessions during all the four days. The program covered important topics in Superconductivity and Magnetism, viz., strong correlations, physics of the vortex state, novel materials, colossal magnetoresistance, nanostructures, thin films and multilayer devices. There were 59 scientific deliberations, with 14 plenary talks and 45 invited talks. Amongst these, 32 talks were by the speakers from abroad (USA, UK, France, Germany, Israel and Japan) and 27 from India. There were about 290 participants from India and abroad. It was heartening to find that a large number of delegates from abroad managed to participate in the conference in spite of severe disruptions in the international flight schedules following the unfortunate happenings of September 11, 2001 in USA. Professor T Venkatesan of Centre for Superconductivity Research, University of Maryland, USA gave a topical colloquium on “High T_c cuprates: From fundamentals to commercialization” and Professor T V Ramakrishnan, F.R.S., of Indian Institute of

Science, Bangalore, India delivered a delightful after-dinner talk on the evolution of the subject of correlated electron systems. Contributed papers were in the form of poster presentations. The deliberations in the conference were lucidly summarized by Professor G Baskaran of Institute of Mathematical Sciences, Chennai, India. Sixteen poster presentations were selected for cash prizes as Best Poster Awards. There was also a cultural evening on September 26, 2001 with classical dance performances by young artists belonging to the four institutions located in the neighbouring cities.

The grand success of ASMM2D-2001 has been due to the untiring efforts of both the staff and students of TIFR and Mangalore University, all other members of the Advisory Committee, the Symposium Organizing Committee and the Local Organizing Committee at Mangalore. Professor S Gopal, Vice-Chancellor, Mangalore University, an academician with vision and deep commitment to institution building, was primarily instrumental in shaping the organization of ASMM2D-2001 at Mangalore University. Professor Jayagopal Uchil, Chairman, Materials Science Department, shouldered the major responsibility for the organizational activities. His tremendous efforts as Chairman, Local Organizing Committee, covered every aspect of ASMM2D-2001, such as, lecture theatre services, networking, accommodation, catering, transportation, cultural program, etc. The Symposium also owes its success to various funding agencies: Tata Institute of Fundamental Research, All India Council of Technical Education, Council of Scientific and Industrial Research, Department of Science and Technology, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, and NSF Centre for Advanced Materials and Smart Structures, NCA & T State University, Greensboro, USA. We also thank the partial support provided by AIMIL Ltd. (Oxford Instruments, U.K.), BOC Edwards, Gammadata Scienta (Sweden), Blue Star Ltd. (JEOL, Japan), Hindustan Lever Ltd., Specialize Instruments Marketing Co. and Varian India Pvt. Ltd.

Last, but not the least, we thank all the plenary and invited speakers, the Chairpersons of the sessions, the authors of poster presentations for the high quality of the work evented and the other delegates, who greatly contributed to the discussions for the scientific success of ASMM2D-2001.

We acknowledge Professor A K Grover for kindly agreeing to share with us the editorial responsibility of preparation of the Abstract Book and the Proceedings of the Symposium. Thanks are also due to Professor E V Sampathkumaran, Member, Editorial Board, Professor H R Krishnamurthy, the Editor, and the Editorial staff of *Pramana* for facilitating the task of these Proceedings as a Special Issue of *Pramana* – Journal of Physics.

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Chairpersons, ASMM2D-2001